CLAIMS:

1. A steering angle estimating apparatus for vehicle that has wheel rotational velocity sensors for four wheels, respectively, and estimates a steering angle of a vehicle based on wheel rotational velocities from the wheel rotational velocity sensors,

wherein relationships in the wheel rotational velocities between two combinations of front and rear wheels on right and left sides are compared, so that slip of the four wheels is detected.

2. A steering angle estimating apparatus for vehicle according to claim 1, wherein when the two combinations of the front and rear wheels on the right and left sides match with each other, even if one of the four wheels slips, a siped wheel is specified so that the correct steering angle can be estimated.

3. A steering angle estimating apparatus for vehicle, wherein slip of the wheel is detected by checking that when turning radiuses of the four wheels fl, fr, rl and rr are respectively designated by Rfl, Rfr, Rrl and Rff, steering angles of the front wheels fl and fr are respectively designated by $\alpha_l$ and $\alpha_r$, an axle distance of the vehicle is designated by L, a vehicle width is designated by E, a turning radius of the center of a front wheel axle is designated by Rf, a turning radius of the center of a rear wheel axle is designated by Rr, and wheel velocities

of the wheels fl, fr, rl and rr, namely, left front wheel, right front wheel, left rear wheel and right rear wheel are designates by $\omega_{fl}$, $\omega_{fr}$, $\omega_{rl}$ and $\omega_{rr}$, respectively, a steering angle $\alpha$ of the center of the vehicle and the respective wheel velocities $\omega_{fl}$, $\omega_{fr}$, $\omega_{rl}$ and $\omega_{rr}$ establish the following relationships:

$$\alpha_{front} = \frac{1}{2}\arcsin\left\{\frac{4L}{E}\left(\frac{\omega_{fl}-\omega_{fr}}{\omega_{fl}+\omega_{fr}}\right)\right\} \qquad \alpha_{rear} = \arctan\left\{\frac{2L}{E}\left(\frac{\omega_{rl}-\omega_{rr}}{\omega_{rl}+\omega_{rr}}\right)\right\}$$

and the front and rear wheels on the right and left sides and the steering angles $\alpha_l$ and $\alpha_r$ of the right and left wheels establish the following relationships:

$$\frac{\omega_{rl}}{\omega_{fl}} = \cos\alpha_l \qquad \frac{\omega_{rr}}{\omega_{fr}} = \cos\alpha_r$$

4. A steering angle estimating apparatus for vehicle according to claim 3, wherein after the vehicle velocity reaches a predetermined velocity, the slip is detected.

5. A steering angle estimating apparatus for vehicle according to claim 3, wherein the slip is detected in predetermined cycle.

6. An electric power steering apparatus that contains a steering angle estimating apparatus for vehicle which has wheel rotational velocity sensors for four wheels, respectively, and compares relationships in the wheel rotational velocities of

two combinations of two of the front and rear wheels on the right and left sides based on signals from the wheel rotational velocity sensors, so as to detect slip of the four wheels.

7. An electric power steering apparatus according to claim 6, wherein even if one of the four wheels slips, the steering angle estimating apparatus for vehicle confirms that two combinations of two of the front and rear wheels on the right and left sides so as to specify the slipped wheel and be capable of estimating the correct steering angle.